

MOE control program to reduce Hydro SO₂

Environment Minister Harry C. Parrott announced in January proposed regulations for a substantial reduction of sulphur dioxide and nitrogen oxides from Ontario Hydro's coal-fired electric generating plants.

As a result, Ontario Hydro agreed to start implementing control activities aimed at a reduction of SO₂ emissions by 4.3 per cent from current levels by 1990.

Ontario Hydro is second only to Inco Ltd. as the largest source of SO₂ within the province and is the largest industrial source of NO_x. Its coal-fired stations produce about

20 per cent of total emissions of these two pollutants in the province, but are not large producers compared with similar sources in the United States.

The regulation will limit SO₂ emissions to 390,000 metric tons beginning in 1985, dropping to a permanent ceiling of 260,000 metric tons by 1990—a reduction of 43 per cent. That percentage figure was derived by averaging the emissions of 1979 and 1980 and the projection for 1981 and comparing it with the 1990 target. The reductions are based on a 3.1 per cent annual increase in electricity

demand, and the limits apply regardless of growth.

In addition, the regulation will require Ontario Hydro to install low NO_x burners on its larger coal-fired stations. This action should result in a maximum of roughly 60,000 metric tons of NO_x in 1985, and about 40,000 metric tons in 1990 because less coal-fired generation will be operating at the end of this decade.

Additionally, Environment Ontario and Hydro have examined a new operating philosophy designed to minimize atmospheric emissions from Hydro's three

largest coal-fired stations, Nanticoke, Lambton and Lakeview. These plants account for more than 90 per cent of Hydro's SO₂ and NO_x emissions.

Under this "Least Emissions Dispatching System (L.E.D.S.)" philosophy, a utility generates power from its "cleanest" plants first, and its "dirtiest" plants last. This ensures that plants already having pollution control measures are utilized fully, and not allowed to stand idle.

The L.E.D.S. concept is being considered by the U.S. Government. It would lead to a significant

reduction of emissions from existing plants without the use of additional pollution control equipment or the use of special fuels.

The proposed program places Hydro in the forefront of SO₂ pollution control in North America. Hydro will be the first in Canada, and one of the first major utilities on this continent to retrofit large-scale SO₂ scrubbers. Also, Hydro's low NO_x burner research program is considered one of the first programs of its kind undertaken by a major utility in North America.

1981 sport fish guides available April 23, 1981

Ontario's unique sport fish guides, published annually since 1977, will be available April 23—in time for the opening of spring trout season on April 26.

Listing over 1,050 popular Ontario angling waters from which fish have been tested for contaminants, the publications "Guide to Eating Ontario Sport Fish," are available in three editions—Southern Ontario, Great Lakes and Northern Ontario—from regional offices of the Ministries of the Environment, Natural Resources, or Northern Affairs.

The new editions contain additional data on over 175 waterbodies from which fish were collected and tested during the past year. Environment Ontario's laboratories have tested over 68,000 fish for a variety of contaminants—mercury, PCBs, mirex and pesticides—since the start of the program.

Charts indicate the safe consumption levels by species and length for both short and long term vacations. The testing program was conducted by the Ministries of the Environment, Natural Resources and Labour.

Subway air is safe

There are no discernible health hazards to employees or passengers in the Toronto subway system, states the final report on air quality in the Toronto subway system. The report is based on an extensive study carried out by the Ontario Ministry of the Environment and of Labour.

The Toronto Transit Commission system now ranks among the best in the world for subway air quality, based on comparisons with other recent subway studies, according to Jim Smith of Environment Ontario, principal author of the "1980 Follow-up Report on Air Quality in the Toronto Subway System."

Airborne dust and its components, lead and asbestos, received special attention because of their potential for adverse health effects. Over a four-year period, 1976 to 1980, the improvements were:

- A 90 per cent reduction in airborne lead levels at both Lawrence and Bay stations.
- A reduction in the concentration of chrysotile asbestos fibres greater than five micrometers in length. These are the fibres which can cause health effects.
- A reduction in airborne dust (total suspended particulate) of 60 per cent at Lawrence station (representing the Yonge-University-Spadina line) and 30 per cent at Bay station (representing the Bloor-Danforth line).
- These improvements are a direct result of a joint effort by the Ontario Ministry of the Environment and Labour and the TTC. The air quality in the subway system was first studied and then appropriate equipment changes were introduced.

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Dr. Parrott leaves political life

Shortly after the announcement by Premier William Davis of an election to be held on March 19, 1981, Environment Minister Harry C. Parrott, MPP for Oxford, issued the following announcement:

After a great deal of consideration, and after weighing all the alternatives open to me, I have made the difficult decision not to seek re-election as the MPP for the Riding of Oxford.

After having the privilege to serve the people of Oxford, and after having accomplished what I feel I set out to do, I feel strongly that it is time for me to change direction in my life and my career. I do so with mixed feelings of regret, and yet, with feelings of accomplishment. It has truly been a great honor to have been given the opportunity to serve both the people of Oxford, and the Province of Ontario.

I am extremely proud of the many achievements this government has been able to accomplish in the environmental field. That progress often requires tough decisions, and I was only able to carry them through, because of the full and complete support I received from my Cabinet colleagues, and most importantly, from the premier of this province, Bill Davis.

There have been many rewarding experiences in the past 10 years. One of them is to have personally known the premier. And to know him, is to respect him fully



Mr. and Mrs. Harry C. Parrott

and completely. The 10 years' association I have had with him and the rest of my colleagues has been very rewarding and fulfilling, and I wish them all the best in the future.

11 waste sites need clean-up

As part of Environment Ontario's ongoing program of identifying and surveying municipal and industrial waste sites, the ministry has ordered further investigation and remedial work on 11 privately owned industrial waste sites located in southern Ontario. Environment Minister Harry C. Parrott announced.

All appropriate municipal authorities and companies have been advised of both the study and the findings.

The 11 sites were among 52 privately owned industrial waste sites studied last fall by engineering consultants. An additional 26 sites were marked for further monitoring or study as a result of the

three-month survey.

"We're going to see that these 11 sites are cleaned up before they can create any problems for their communities," said Dr. Parrott. "We are continuing our investigations to ensure the environmental integrity of the land, air or water

(continued on pg. 7)

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It's all one world...

Joint effort can control acid rain



Rainforest to hamburger

England's and North America's demand for timber and beef are responsible for thousands of square miles of tropical rainforest being cut down and turned into giant cattle pastures, says a report published in the Bulletin of the Chicago Field Museum of Natural History.

But the fragile tropical forest

soil cannot sustain continued feeding of cattle, and beef raised on such soil is lean and only good for pet foods or for sale to fast food hamburger chains.

The author of the article should know best. He is Ray Kroc, the founder of the McDonald's hamburger chain that produces billions of hamburgers annually.

Do trees create smog?

How much trees contribute to smog is the subject of a \$114,000 study contracted by the Environmental Protection Agency to a research company in California. Some industries affected by the EPA's rules controlling their emissions have argued for several years that industry should not be held to a higher standard of purity than nature. Because it is known that oaks and pines emit certain hydrocarbons, it has been suggested that smog is at least partially a natural phenomenon.

Caves threatened

An extensive complex of caves formed some 440 million years ago by acidic rainfalls in Malaysia near Kuala Lumpur are threatened with destruction by large-scale quarrying operations.

The caves are not only exciting to look at. They also are the habitat of numerous rare species

of plants and animals, some of which can not be found anywhere else.

MX missiles hurt environment

The new MX missile system will have unbearable effects on the environment, several environmental groups in the United States maintain.

MX silo builders would have to compete with Utah and Nevada ranchers for scarce water and deplete the water table. Dust kicked up during construction of 13,000 Km of roads and of 4,600 missile shelters would pollute the air severely, as would sulphur and nitrogen emissions from equipment and power plants needed for the missiles. Fragile desert vegetation would be removed, leaving the soil open to erosion and infestation with weed toxic to livestock.

The necessity of a joint formal effort of Canada and the United States to control acid rain was the main theme of a presentation given by Environment Ontario assistant deputy minister Walter Giles to a public seminar on the subject held in Bowling Green and in Cincinnati in Ohio.

At the seminar a wide variety of opinion was heard. Craig Weidenbaum, plant pathologist at Ohio State University, for example, maintained that North America is far from being threatened and that not enough is known about acid rain to justify costly regulations. Some potential hazards attributed to acid rain, he said, are man made.

Giles, however, pointed out, that the long range transport of pollutants is a fact well established not only by Canadians, but also by U.S. researchers.

Because transboundary pollution

is of critical concern to Ontario and to Canada's eastern provinces, an immediate reduction of the emission of serious pollutants is needed from existing U.S. power plants as well as from the 300 new plants which are expected to be built in the U.S. in the next two decades.

The vital need for controls to reduce SO₂ and NO_x emissions from U.S. utilities has been made clear in the "Acid Rain" report

Ontario has moved quickly

published in July 1980 by the U.S. Environmental Protection Agency.

The report also states that Canada receives from the U.S. two to four times as much SO₂ and 11 times as much NO_x as the U.S. gets from Canada.

On its side Ontario has moved quickly to determine the source of acid rain and to find remedies. Ontario is also much encouraged by the foundations laid for an air quality treaty already established between the U.S. and Canada.

Ontario has also shown its readiness to act by requiring Inco Limited and Ontario Hydro to reduce their emissions and by establishing the least emission dispatch system.

This system alone could, according to U.S. researchers, reduce SO₂ emissions in most of Illinois, Indiana, Ohio, Kentucky, West Virginia and in parts of Pennsylvania by 20 per cent.

Ontario's efforts, however, would be wasted if the U.S. states would not follow its lead. To delay action would mean irreversible damage to the natural environment in both countries.

Others have waste problems, too

While Ontario is seeking its solution of the problem of the disposal of hazardous industrial wastes, other jurisdictions are also taking steps to deal with the problem.

Alberta Environment Minister J.W. Cookson recently announced the establishment of a Hazardous Waste Team with the task of finding a site for the location of waste treatment facilities. Besides siting the team will also look at financial arrangements, ownership, siting criteria, plant design and waste transportation, classification of wastes and legislation.

In New York State, Commissioner Robert Flacke of the Department of Environmental Conservation announced a plan for the development of a high-technology treatment facility for hazardous waste. About half of the 1.3 million tons of potentially dangerous wastes generated in the state each year are either not adequately or not at all treated before disposal.

Flacke's plan demands proof from established waste treatment companies that the waste they receive is adequately treated and how they would select, design and maintain new high-technology facilities for toxic waste disposal. The company's proposal should include performance standards and a list of types and priorities of wastes needing treatment.

A statewide search for possible sites for the establishment of treatment facilities is in progress. The counties of Niagara and Erie are not included in this search because they have approved facilities.

A geological consultant has been hired to survey the state for appropriate site locations. The desired site would be between 500 and 1,000 acres in size. Cost of the

high-technology treatment facility is estimated at \$60 million.

The Louisiana Environmental Control Commission in December approved construction of the largest toxic waste disposal plant to be built in the U.S. at a cost of \$84 million. The plant will be built by the Industrial Tank Corporation of

California on a site between New Orleans and Baton Rouge near an historic Louisiana plantation house, a subdivision and an elementary school.

Various groups opposing the plant have announced that they will use the courts to stop its realization.

Safe food additives

After reviewing 415 natural and artificial food additives the U.S. Food and Drug Administration found that they are generally harmless. Only salt was targeted for restriction or possible removal from the food supply because of its potential for increasing hypertension.

Additional research may be done on caffeine, BHA and BHT and on such vitamin additives as iron, zinc, vitamin A and vitamin D.

Fast fibre counter

The counting of asbestos fibres in air is a slow and laborious pro-

cess (see article in Legacy, September/October 1980). Vicars Instruments of York, England, has announced the development of equipment that can do the job quickly and accurately. The equipment can examine 100 samples a day by passing the samples first through a strong magnetic field that aligns all asbestos fibres.

The prepared sample then scatters a light beam, and a detector measures the light reflected from the fibres. A microcomputer then transforms this reading into usable data that establish the presence, the amount and the type of asbestos present in the sample.



Ministry
of the
Environment

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Minister
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Deputy Minister

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Ontario scientist lectures in China

In September and October 1980 Gabrielle Tung, a scientist with the air resources branch of Environment Ontario, visited at the invitation of the Chinese Government, universities in Shenyang, Gongzhuling, Beijing, Shanghai and Hongchow. During her four-week stay in China she gave 14 lectures to audiences of between 100 and 500 scientists, on damages to vegetation caused by air pollution and on the use of plants as pollution indicators.

After her return, Mrs. Tung reported on her experiences:

In 1980 an official of the U.S. Environmental Protection Agency brought a personal air quality monitor with him to China. The small, portable instrument can measure the amount of particles in air with a precision of parts per million. The highest reading the instrument had ever registered in Washington was 50.

Once switched on in Peking, however, it indicated a pollutant level of 120. In Wuhan, a centre of heavy industry, it registered 400. Then it broke.

waterways, rivers affected

China has given little thought to the protection of its environment since it started its vigorous industrial revolution about 30 years ago. The main pollution problems existing in China today are water pollution and damages caused by the large amount of toxic pesticides used in agriculture.

All major waterways, the rivers, lakes and the sea coast are seriously polluted and their fish populations are significantly reduced. High doses of toxic chemicals contaminate food and human bodies.

Scientists told me that in Shanghai one out of three cups of tea may be considered non-drinkable. A pesticide researcher at the Zhejiang agricultural university mentioned that in some areas the chlorine content of human livers exceeds by a few times the acceptable level because of the heavy use of organic chloride as a pesticide.

large use of coal in industry, homes

In the cities problems are caused by the large use of coal for the production of electricity, in industry, for train transport and for domestic cooking. There is also a lack of vegetation to help reduce air movement of dust. Sulphur dioxide levels are extremely high and well above the thresholds established in the West.

I spent two weeks in the province of Liaoning in the southern area of northeastern China. The province has a population of about 30 million. Shenyang, its capital and largest city, is China's most important centre of heavy industry.

The Shenyang air is heavily polluted by emissions from large factories and from the famous Anshan steel manufacturing centre located 120 km southwest of the city.

The city hovers under a constant canopy of smog. Many people wear gauze masks in fall and winter to filter the air they breathe.

I have seen ozone and SO₂ injuries on needles of pine trees on the university campus and in parks, and on bean and cucumber leaves grown in the backyard of almost every home I visited.

The Chinese are well aware of this, and the protection of their health and of their environment is now getting a great deal of attention. The first environmental protection law introducing standards for emissions and noise was passed in 1979.

pine trees, beans injured

But the knowledge of the scientific community about pollution is still limited. The community is eagerly seeking first-hand scientific information and technology to begin to catch up to the standards of developed countries.

Ontario's reputation for strong and advanced environmental protection and research became well known, especially in Liaoning province where geographical conditions and vegetation are similar to Ontario's.

M.K. Tsai, director of the Liaoning Environmental Protection Research Institute and a former colleague, arranged for my visit and helped to arrange for my presentations. I found that scientists involved in the study of air pollution are not aware of the injuries air pollutants can cause to plants. They have never given any thought to the use of vegetation as an inexpensive indicator of air quality, and that green plants can absorb toxic gases in the low atmosphere to efficiently clean polluted air.

In my lectures I therefore emphasized the diagnosis of symptoms various air pollutants cause in plants, the methods and techniques used to assess air pollution in field surveys and research studies; and the specific techniques available for the use of plants as indicators of air quality.



Mrs. Tung in front of an elaborate tapestry she received as a gift from the Chinese Government.

(photo: Tessa Buchan)

My presentations were followed by one to two hour discussion periods. I received dozens of questions from the audience ranging from water pollution, on mechanical techniques of biological control methods, on the use of micro-

activities to convert toxic compounds into usable forms. Some scientists were also interested in food chain studies.

I answered all I could to the best of my knowledge. If the questions were outside of my area I brought

them back to pass them on to experts in Canada.

My first trip to China was, I hope, a beginning. I would very much like to become a link in a continuing chain of communication between Canada and China.



Chinese scientists follow attentively one of Mrs. Tung's lectures.



J.C. Wastes' truck leaves an underground collection site.

(photo: Tessa Buchan)



Waste paper is collected at the MGS ramp.

(photo: Tessa Buchan)

Paper recycling saves trees, energy

A saving of forest resources, energy and landfill space and an additional revenue of \$25,000 were all achieved by Ontario Government employees in the first year of Project Paper Recycling.

In this project, initiated in October 1979 by Environment Ontario, government offices located in Metro Toronto are involved in the collection of high-grade office paper. In the beginning, 13 offices participated.

By October 1980, 10,000 Ontario Government employees in 21 buildings had collected 240 tons of such paper valued at about \$24,000.

The success of the project means that a 15-acre forest of more than 3,000 trees has been saved from destruction. The saving in energy cannot be determined as easily, because it involves elimination of the transport of pulpwood from the forest, the handling and pulping of the wood and other operations.

The collected paper would more than fill a two-story, single-family home. A corresponding saving of space in a landfill site, to which the paper would have been

delivered, may not seem to be much, but is still significant.

The revenue of \$25,000 collected from sales to paper manufacturers means that the expenses incurred by the purchase of containers and for the promotion of the project will be recovered within 30 months.

The Ontario Government uses about 34,000 tons of high-grade paper yearly. This quality of paper is generally used in such products as letterheads, bond paper, computer printouts and in copiers.

Not all of this paper can be recovered, partly because files must be kept and because colored papers used in forms are difficult to recycle. In addition, collection of papers in the many small government offices located throughout the province is not yet economically feasible.

But the collection of nearly 10 per cent of all paper of this type used in the first year of operation means that the project is off to a good start.

The high-grade paper collected starts on its way to recycling in desk-top containers supplied to all participating offices. Employees

deposit papers that have served their purpose in these containers and empty them into metal bins placed on every floor of office buildings.

Additional amounts are collected from sales to paper manufacturers and in printing shops. An average of about a quarter pound of such paper is collected per employee daily.

The metal floor bins contain burlap bags, and the full bags are collected by office cleaning staff and delivered to collection areas. Confidential papers are either shredded on the premises or collected in specially constructed locked bins for shredding before they enter the recycling stream.

The contract for the collection of waste paper has been awarded to J.C. Waste Management Company Ltd. The company operates a sorting and baling deposit in Milton.

Two of the company's trucks leave Milton daily at about midnight to collect the waste paper at 10 collection points in Queen's Park, on Bay Street and St. Clair Avenue and in Downsview. Before returning to the company's depot, the trucks are weighed on a public scale in Milton.

At the depot 6 persons work in two shifts to sort the collected papers on the truck and remove the few contaminants that have found their

way into the system. After sorting, the paper is baled in a hydraulic press and readied for pick-up by paper manufacturers.

The industry recognizes 55 grades of paper, and the sorting of even high-grade paper calls for a certain amount of expertise.

John Campbell, J.C. Waste's plant manager, likes to employ East Asian immigrants in sorting. "In Viet Nam and other countries a much larger variety of paper products is used in daily life, and people from these countries seem to have a special ability to tell paper varieties apart," Campbell explains.

For other operations along the sorting floor, and as helpers on mentally retarded people. "Once you have adjusted your operation to their handicaps, you cannot get better workers. They are reliable, 100 per cent honest and really work to the best of their abilities," he says. "They may fill out forms slowly — but whatever they write is eminently legible — which is another advantage."

J.C. Waste Management has been in the paper recycling business for about eight years, and is sponsoring paper collection drives

organized by a number of groups like Boy Scouts, parishes, service clubs, etc. in and around Toronto. John Campbell believes that the collection of used papers in Ontario is only at the beginning of its potential development.

"Not even 10 per cent of the paper that is used in the province is now being recycled — and industry is still importing large amounts of waste paper from the United States. Indications are that our neighbours in the South will soon need all the paper they can collect themselves, and we will all have to make a special effort to supply the used paper industry needs."

"Up to 30 per cent of recycled and de-inked high-grade paper can be used in fine paper manufacturing and the end product will not show the slightest impairment. For newsprint the share of recycled material can be much higher, and we cannot get enough of that by far," Campbell says.

"The Ontario Government paper recycling project is a valuable contribution, and I hope that much more of the high-grade paper may be collected and may find its way into the paper manufacturing stream, where it is urgently needed."



In the Milton depot, sorted paper is placed in a baler.

(photo: Tessa Buchan)

OWMC directors appointed

Environment Minister Harry C. Parrott appointed Firm Bentley, James M. King, Harvey V. Polk, R. Stephen Rodd and Frank Sommer to the seven-member board of directors of the Ontario Waste Management Corporation. Dr. Donald A. Chant has been appointed chairman of the corporation previously.

G. Firman Bentley, group vice-president, rubber and plastics, of Polysar, Sarnia, has been selected to the OWMC board as industry representative. Mr. Bentley joined Polysar in 1964, worked for Polysar, Belgium from 1971 to 1978 and returned to Canada to as-

sume his present position with the same company.

James M. King is president of Alfa Laval Limited of Peterborough. He will represent the public at large and small business on the board. He graduated from the University of Toronto as mechanical engineer and worked for General Electric and J.J. Turner Limited, both in Peterborough, before joining Alfa Laval.

Harvey V. Polk is chief engineer of specialized engineering of the Steel Company of Canada in Hamilton and director of the Association of Iron and Steel Engineers and last chairman of the

Niagara section. He represents industry on the OWMC board.

R. Stephen Rodd is a rural planner and professor of agricultural economics at the Ontario Agricultural College in Guelph. He is currently on leave from OAC as acting director at the Centre for Resources Development at the University of Guelph. He represents agricultural interests on the board.

Frank Sommer, a pork producer, is director of the Haldimand West Federation of Agriculture and a past president of the OFA for Haldimand. His nomination was endorsed by the Ontario Federation of Agriculture.

Sewer pipes are rejuvenated

A new method developed in Ontario to rejuvenate deteriorated sewers is being used to reline the sewage collection system in the Crystal Beach section of Fort Erie.

The project is designed to reduce considerably the continuous overloading of the Crystal Beach sewage treatment plant by eliminating the heavy infiltration of ground water into the old system built in 1925. Cost of the relining by this method is expected to be significantly less than the cost of replacing the old pipes.

The Crystal Beach project includes the relining of about 6,000 metres of 700 mm to 250 mm diameter sewers and of about 600 10- to 15-metre long, 150 mm diameter service connections to individual users.

In the rejuvenating process, a video camera is first pulled through the existing sewers from manhole to manhole. Any obstacle found, as, for example, intrusions of lateral piping, sediments, roots, calcium deposits, open joints, cracks in the pipe, are recorded on photos and a chart for future reference. The video camera is followed by a reaming device and a cleaning pig. The rotating head of the reamer removes all solid obstacles, the cleaning pig all loose debris.

When the system is clean, short segments of pipe are then butted and heat-fused, at street level, into the correct continuous length for pulling through the existing sewer.

Sections of up to 700 metres (1/2 mile) have been successfully inserted.

The smaller pipe diameter is offset by the smooth interior surface of the plastic pipe. With this method, street cuts are required at each house lateral only, as opposed to a continuous open cut for more conventional methods.

Lateral connection to individual houses are also inspected with a

inspected by video unit

smaller video unit, reamed, cleaned and if required, re-lined with plastic pipe of suitable diameter.

In the Crystal Beach project, excavations are needed only in a few places where the old concrete pipe has collapsed or other large obstacles had to be dealt with. The lining is being installed with only a minimal disruption of the service to houses and businesses in the affected area.

Two construction contracts for the Crystal Beach project have been completed. Tenders for a third contract to complete the job will be called in spring.

This method shows promise for congested areas. Some refinements are required to overcome special

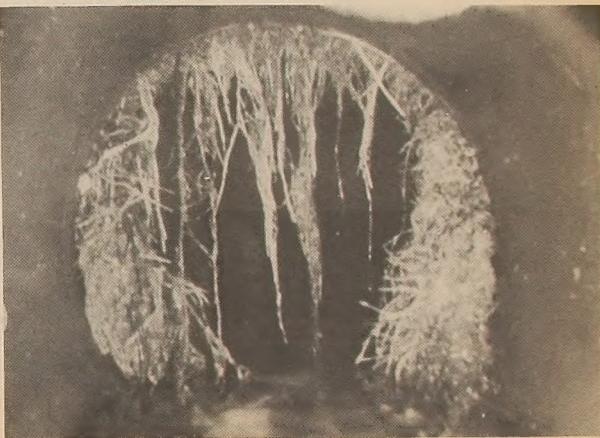


Photo of a sewer pipe joint partly blocked by intruding roots.

problems and these are under review by the ministry.

Subcontractor for the relining of the pipe is Duraton Ltd. of Toronto. Consulting engineers are Proctor and Redfern Ltd. of St. Catharines. Project manager is A.B. Patterson of Environment Ontario's project co-ordination branch.



One of the workers prepares the reaming pig for action.



The new plastic pipe lining is pulled into the old sewer pipe system.

Triple pilot plant solves manganese problem

by Ken Ballantyne

Once upon a time the people of Verner, a small town 75 km. east of Sudbury, had a serious problem: their laundry came out of their washing machines dirtier than it went in.

At the same time the town's

water supply emitted a smell so foul that it put local skunks to shame.

Five years ago, Environment Ontario experts solved the problem by providing the town with a water treatment plant with some special facilities. But soon they ran into another difficulty. The method they used to clean the town's water

supply proved to be quite expensive.

In 1979, for example, the CO₂ needed to treat the water for the two months when treatment was necessary, cost \$2,200, a considerable amount for the community of 1,200 residents.

To find a cheaper way, Environment Ontario added a mini-

ture triple pilot plant to existing facilities.

This pilot plant is a scaled-down (7.7 l per minute (5 Imperial gallons per minute) water treatment plant. The Verner Water Treatment plant can process 1,600 liters per minute (350 IGPm).

Operator of the pilot plant was Marcel Lafreniere, one of Environment Ontario's Experience '80 students. His job was to determine which one of several systems can best rid the town of the cause of its water troubles: manganese.

Manganese is found in water quite frequently. It is not harmful to health, but leaves unsightly brown stains in laundry, sinks and toilets. And it smells. As Gary Marin of Environment Ontario's water technology section explained, manganese forms a variety of compounds with other elements, and each of them must be treated differently.

manganese is harmless

In the present water treatment plant, the manganese is removed by the addition of ferric chloride and lime to the water. This treatment raises the pH of the water to about 11.2, a very high level of alkalinity. To lower it, carbon dioxide is added to the water. This brings the pH back to a near neutral 7.5.

For some unexplained reason, manganese is found in the town's water supply only for part of the year, usually between late spring and early winter. Since the demand

for water is limited and the problem occurs only for part of the year, the chief operator of the plant, Gaston Lavigne of Environment Ontario's Northeastern Region's utility operations section, can purchase only small amounts of carbon dioxide at retail prices.

The pilot plant was located in a corner of the main plant. It consisted of three units connected with a seemingly endless array of pipes. Each unit could be operated separately or in various combinations with the others.

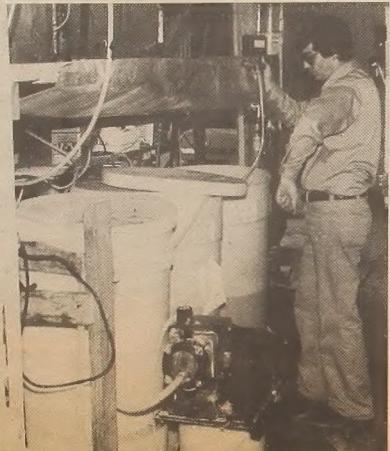
The first mini-plant simulated alum coagulation followed by a filtering process during Durcon electromedia and a greensand filter to remove the manganese. Alternatively, the manganese was removed by the application of potassium permanganate.

The second system applies the same principles as the first, but superchlorinates the water to oxidize the manganese.

In the third system the water is aerated before it is subject to the same process used in the mother plant.

During the summer, Lafreniere used these methods in different combinations and determined, in co-operation with ministry experts, that alum coagulation combined with manganese removal by potassium permanganate showed the best results.

A detailed cost evaluation, considering material, capital and operating costs is now under way, but indications are that the people of Verner will get cleaner water at a lower cost, soon. And live happily ever after.



Marcel Lafreniere operates the triple pilot plant.

(photo: Ken Ballantyne)

'The Case Against the Rain'

A brochure published by the Ontario Ministry of the Environment graphically illustrates and describes the nature and magnitude of acidic precipitation in the Province and throughout eastern North America. The phenomenon is acknowledged by scientists and governments to be the major environmental issue of the 1980's.

Entitled "The Case Against the Rain," the report describes the extent to which Ontario is affected by acid rain; the programs the Province has under way to meet the challenge, and addresses the need for action required both in Canada and the United States to curb acid rain pollution.

Ontario Environment Minister Harry C. Parrott, announcing publication of the report, said that his officials attending the annual meeting of the International Air Pollution Control Association in Montreal last June were surprised to learn that very few of this professional group, with headquarters in Pennsylvania, were "aware of the extent to which Canada is concerned" or being affected by acidic emissions from the United States."

"Therefore, to more clearly bring our situation to the attention of our neighbours and their legislators, we are mailing this report to senators and congressmen representing northeastern states where much of this pollution originates," Dr. Parrott said.

"We hope this report will its

wide circulation will alert still more of our citizens and those of our neighbours to the challenge of acid rain and what must be done to bring about solutions within the crucial time frame of the next ten years.

...and the costs of the rain

To get a clear picture of the cost of acid rain to society, Environment Ontario has launched three separate studies.

The research will measure actual and potential damages to lakes, fish populations, wildlife, forests or crops affected; in physical units, in dollars; and in the loss of environmental amenities.

The studies comprise:

- **A Tourism and Recreation Study**, currently being carried out by Toronto consultants Currie, Coopers and Lybrand Ltd., which will generate estimates of the impacts of acid rain on tourism, including tourists and recreation expenditures and the jobs that depend on that sector.

- **An Amenity Value Survey Study**, being designed by ARA consultants of Toronto, will more clearly discern and estimate values which people place on environmental and recreational resources. This survey will

also be expected to provide new data on recreational activities, and will be carried out during the summer of 1981.

- **A Financial Value Study**, which will focus on actual and potential effects on sectors of the economy which produce goods and services for sale and for which market prices are generally available. Commercial fishing, corrosion of structures and materials, effects on native fisheries, reduced production in forestry and agriculture will be considered. This study is to go to tender.

The studies are part of the province's Acid Precipitation in Ontario Study (APIOS). When they are completed, Ontario will be able to move ahead quickly with further control strategies since the ministry's scientific data will clearly determine the cost of physical damages due to acid precipitation and, therefore, the benefits of abatement.

New groundwater guide

The newest methods used in the search for groundwater and for the construction of wells are described in a publication recently released by Environment Ontario. The booklet, titled "Wells and Groundwater Supplies in Ontario" also explains Ontario water well regulations as they concern the well owner and the well contractor.

Groundwater can provide an inexpensive and constant supply of good potable water that, in most cases, does not require any chemical treatment. Modern hydrogeologic methods have increased the probability of finding a good source of groundwater in many locations.

Well applied modern construction techniques can assure a reliable

supply of groundwater uncontaminated by leakage from shallow polluting sources such as septic systems.

The booklet also contains a guide for drawing up a contract with a well-well contractor, gives a suggested list of chemical parameters and lists regional public health laboratories equipped to test water quality.

The guide is, however, not intended as a manual on well construction nor a manual on pump installation, as both these operations require considerable background training and experience.

Copies are available in English and French free from Environment Ontario regional offices.

Pesticides go metric

To ease the transition to the Metric system in the use of pesticides the Ontario Ministry of the Environment and of Agriculture and Food and the Ontario Provincial Council of the Canadian Agricultural Chemicals Association have co-operated in the development of a poster for the use of vendors of pesticides. The poster is designed to enable the vendor to make accurate recommendations in metric units to growers and other pesticide users.

The use of the metric system in

pesticide applications is a three-step procedure. It involves:

- the conversion of acres to hectares (10 Acres = 4 hectares);
- the calibration of sprayer tanks in metric (1 gallon = 4.5 litres);
- the application of the appropriate number of kilograms or litres per hectare, as given on the pesticide container label.

This approach will make it possible to use the metric system completely instead of converting back and forth to the various units.



Environment Ontario's new phytotoxicology (= study of plant injuries) laboratory has been designed by Natalie Liacas, architect with the Ministry of Government Services.
(photo: Tessa Buchanan)

Phytotoxicology moving to new laboratory

A new, larger and more efficient laboratory for the study of the effects of pollutants on vegetation will be opened in Brampton on the site housing Environment Ontario's training facilities for sewage treatment plant operators.

The laboratory will replace temporary premises occupied by the controlled environment unit of the air resources branch on Melita Street and several open garden

areas used by the unit at various locations in the province.

The new laboratory will have double the greenhouse space, four instead of two controlled environment chambers, a laboratory for on-site studies and a larger potting room. A two-acre open garden area will be used for outdoor experiments and a smaller, separate garden, will be used mainly as a nursery.

The greenhouse is divided into two equal-sized areas in which different temperature and humidity conditions tailored to the needs of different species of vegetation can be kept.

In the four controlled environment chambers various plant species can be subjected to a variety of pollutants from a variety of concentrations.

In the two-storey controlled environment chamber room space is also provided for simulated acid rainfall experiments.

The new laboratory will be manned by a permanent staff of two scientists and two technicians. For scientists of the ministry's phytotoxicology section space is provided in a laboratory equipped with microscopes, extraction ap-

paratus and other support equipment.

Several ongoing projects will be continued under improved conditions in the new laboratory:

- the search for a highly sensitive field indicator of plant toxic concentrations of SO₂ in air,
- the development of techniques for the use of pea seedlings to monitor plant toxic concentrations of ethylene in the air.

New equipment monitors fluoride levels

New monitoring equipment for the measuring of fluoride levels in air and new control abatement technology and environmental health implications are studied by Environment Ontario. A report on the situation was tabled by Environment Minister Harry C. Parrott in the Ontario Legislature.

The report compared 1978 and 1979 fluoride emission levels in 13 areas of the Province containing major fluoride sources.

The Ministry of Health, Labour and the Environment are jointly studying fluoride intake and potential effects such as tooth mottling among children in the vicinity of Toronto Brick Company.

"Our emission criteria to date have been based on crop and vegetation damage from fluorides rather than effects on people," Dr. Parrott said. "We have found vegetation affected by fluoride at relatively low levels while people, exposed to concentrations a hundred times as great have shown no effects."

He said that Ontario's criteria are being exceeded in several areas

of the province and that his ministry was field testing new tape samplers to get more accurate and direct measurements of fluorides. "While the lime candle we now use can show patterns, individual measurements can be affected by temperature and humidity and are unreliable.

"In addition to studying better measurement techniques, we are keeping a close eye on the development of new technology to control fluoride emission from brick plants and other major sources, to develop the use of more practical and effective control in Ontario.

plant property. The company is investigating methods to reduce fluoride emissions. Modifications to one kiln have been completed and the effects are being studied. A tri-ministry study is under way in the area and monitoring continues.

Effects of emissions from this U.S. plant have decreased markedly in Cornwall and on Cornwall Island since the early 1970's as a result of abatement demanded by Ontario and Canada Environment officials. Federal/Provincial monitoring and study continues.

Status of sources

The status of a number of Ontario sources of fluoride emissions is as follows:

Amherstburg

Allied Chemical Company (hydrogen fluoride production).

A Control Order is in effect on the company. A number of significant improvements have been made to the operation and control of the plant with the result that the Ontario standard of fluorides is met on a day-to-day basis. Accidental emissions occur less and less often and are of less duration so that vegetation damage is decreased. Complaints of vegetation damage

have been resolved with the exception of one case still under negotiation.

Ingersoll

Chicago Vitreous Company (ceramic frit manufacturers).

A high energy scrubber was installed at the request of the ministry. Some fluoride emissions in excess of criteria have been traced to control equipment malfunctions. There have been no vegetation problems and monitoring continues.

Port Maitland

International Minerals and Chemical Corporation Canada Ltd. (fertilizer plant).

The emissions of this plant were the subject of the Hall report. Since that report in 1968, \$1 million in pollution control were installed and the company has been required to curtail operations if fluoride levels in forage become too high. Monitoring continues with no apparent problems at this plant.

Toronto

Toronto Brick Company.

Fluoride damage to sensitive vegetation has been observed near

Brampton/Bramalea

Brampton Brick Ltd.

Trace damage to sensitive vegetation has been recorded and stack tests on the company's kiln are continuing. Air monitoring is continuing.

Gloucester Twp.

Dominar Incorporated (brick plant).

Elevated lime candle readings were not supported by vegetation study. Intensive monitoring by alternative equipment showed fluoride emissions were acceptable.

Cornwall Island/Cornwall

Reynolds Metals Company, Massena, New York.

Port Hope

El dorado Nuclear Ltd. (nuclear refinery).

Monitoring shows consistent control but slight off-property vegetation damage. The ministry has asked Environment Canada to require further emission controls.

Rosslyn Village, Thunder Bay

Thunderbrick Ltd.

Monitoring and vegetation samples indicated fluoride emissions in excess of criteria. The company has agreed to reduce production during growing season and is modifying operations to reduce emissions. Monitoring continues.

Waste sites

(continued from pg. 1)

surrounding all old sites which have been used to dispose of industrial and municipal waste."

Six of the 52 sites continue to receive industrial waste for disposal. The consultants' reports on these six sites will assist ministry regional staff in evaluating on-

going abatement programs.

The ministry's engineering consultants first prepared an inventory of industrial wastes disposed in the sites, then conducted tests, including water monitoring to determine possible problem areas. Cost of the study is about \$140,000.

A computer system designed to control water purification and water supply of the South Peel water system is being installed at the East Avenue water plant in Mississauga.

On completion of the job, the computer will remotely control six major pumping stations in the system and will be able to adjust and redirect the supply of water.

In addition, it will also operate

the new underground Lorne Park 50 million gallon per day water treatment plant.

The computer will upgrade the existing supervisory system and will allow a better meeting of peak demands of the 420,000 people now served.

Installation of the \$1.6 million project has been awarded to Control and Metering, a Division of Kemsak Ltd. of Toronto.



(photo: Tessa Buchan)
Dr. Parrott takes a short rest from the hard work of planting cattails at the experimental sewage treatment project in Listowel.

Two and a half years with Dr. Harry C. Parrott



At a meeting with federal Environment Minister John Roberts, Dr. Harry Parrott discusses the control of acid rain originating outside Canada.

(photo: Hans Eijzenck)



After selecting the winner of a coloring contest held for school children, Dr. Parrott poses with the winning entry.

(photo: Hans Eijzenck)



Before returning to his office at 135 St. Clair Ave. West, Dr. Parrott stops for a chat with canvassers for the Cystic Fibrosis Foundation.



On becoming a member of the "Order of the Tank" in recognition of his involvement in the Mississauga train derailment, Dr. Parrott examines the model of a railroad tank-car.

(photo: Hans Eijzenck)